



# First record of *Steindachnerina insculpta* (Fernández-Yépez, 1948) (Characiformes, Curimatidae) in Argentina

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## Abstract

Recent expeditions to northwestern Argentina revealed the presence of an unknown species of Curimatidae for the Bermejo river basin. The morphometric and meristic analyses of these specimens allow us to identify them as *Steindachnerina insculpta* (Fernández-Yépez, 1948), which is here reported for the first time in Argentina.

## Key words

New record, distribution range expansion, Bermejo river basin, northwestern Argentina.

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## Introduction

Curimatidae is a monophyletic family within Characiformes and is supported by synapomorphies related to the branchial apparatus, buccopharyngeal complex, hyoid arch, jaws, palatine arch, and neurocranium (Vari 1989, Dillman et al. 2016), which are associated with specialized food acquisition and processing (Netto-Ferreira and Vari 2011). Vari (1989) proposed the monophyly of *Steindachnerina* Fowler 1906 on the basis of 4 synapomorphies related to modifications in the first and second infrapharyngobranchials, the ventral process of the third hypobranchial (H3), the basihyal, and associated basihyal tooth-plate.

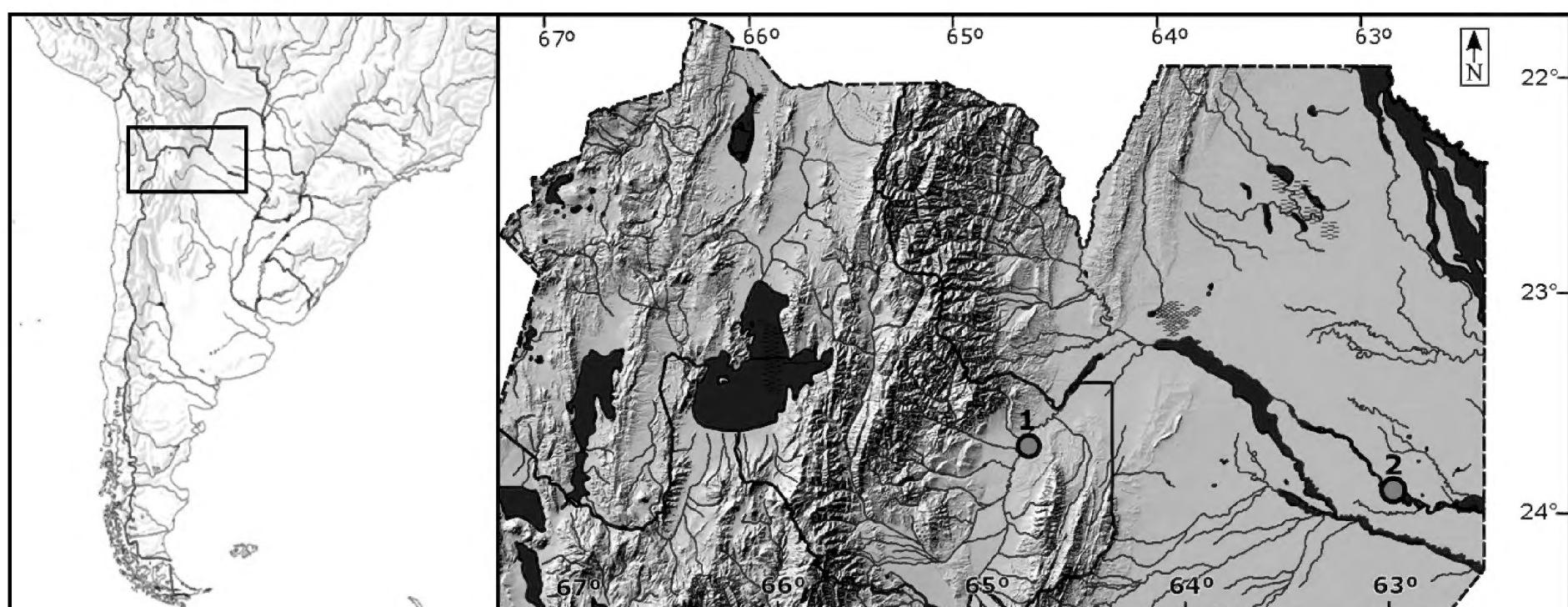
Currently, *Steindachnerina* is composed by 24 valid species distributed in a wide geographic range in South America, from Venezuela to Argentina (Netto-Ferreira and Vari 2011). Three species of *Steindachnerina* have been recorded from Argentina (Mirande and Koerber

2015). *Steindachnerina biornata* (Braga & Azpelicueta, 1987) and *S. brevipinna* (Eigenmann & Eigenmann, 1889) inhabit the Uruguay and Paraná rivers, and *S. conspersa* (Holmberg, 1891) inhabits the Paraguay river basin. The geographic range of *S. brevipinna* and *S. conspersa* also includes the Upper Bermejo river basin in northwestern Argentina (Azpelicueta and Braga 1991, Monasterio de Gonzo 2003).

Recent expeditions to northwestern Argentina revealed a distinct curimatid species for the Bermejo river basin. The aim of this contribution is to report the occurrence of *Steindachnerina insculpta* in the Upper Bermejo river basin, representing the first record of this species in Argentina.

## Methods

Morphometric measurements were taken using calipers to nearest 0.1 mm following Vari (1991) and are expressed



**Figure 1.** Map of northwestern Argentina area. Black rectangle indicates the area of the recorded specimens of *Steindachnerina insculpta*: San Francisco River (1) and Madrejón El Divisadero (2) in the upper Bermejo River.

as percentages of standard length (SL) and head length (HL). Numbers between parentheses after meristic feature indicate the number of specimens with that specific count. Specimens were cleared and stained (C & S) following Taylor and Van Dyke (1985). Vertebral counts were based in a single C & S specimen and considered the fused PUj + U1 as 1 vertebra, while the Weberian apparatus complex was counted as 4 elements. Comparative material is presented in the Appendix.

Specimens recorded in this study were deposited at the Ichthyological collection of Fundación Miguel Lillo. Collecting permits were obtained from Ministerio de Ambiente y Producción Sustentable, Salta (Res. 090227-61200/2015-0) and from Ministerio de Ambiente, Jujuy (Expediente N° 1103-306-M/2016 Resolución 137/2016-MA).

**Institutional abbreviations.** CI-FML, Ichthyological collection of Fundación Miguel Lillo, San Miguel de Tucumán, Tucumán; MZUEL, Museu de Zoologia da Universidade Estadual de Londrina, Londrina.

## Results

Our analysis of specimens from 2 localities in the Bermejo river basin (Fig. 1) allowed us to identify them as *Steindachnerina insculpta*.

### *Steindachnerina insculpta* (Fernández-Yépez, 1948)

**Material examined.** Argentina, Jujuy, Libertador San Martín, San Francisco River, Bermejo river basin ( $23^{\circ}50'27''S$ ,  $064^{\circ}37'24''W$ ), September 2016, G. Aguilera, F. Alonso, M. Mirande, and G. Terán (CI-FML 7340, 18 ex. (1 C & S), 47.8–100.9 mm SL). Argentina, Salta, Rivadavia, La Unión, Madrejón El Divisadero, Bermejo River ( $23^{\circ}46'28''S$ ,  $063^{\circ}04'00''W$ , May 2015, F. Alonso, M. Mirande and G. Terán (CI-FML 7336, 20 ex., 77.0–88.8 mm SL).

**Identification.** Specimens are identified by the presence of multiple lobulated fleshy processes on the roof of the



**Figure 2.** Multiple lobulate fleshy processes on the roof of the oral cavity, a diagnostic character of *Steindachnerina insculpta*, CI-FML 7340, 47.7 mm SL, from the San Francisco River, Bermejo river basin.

oral cavity (Fig. 2), the lack of a dark spot on the basal portion of the middle dorsal fin (Fig. 3), 41–46 perforated scales on the lateral line series, and the presence of a dark stripe along the midlateral surface of the body. These features were considered by Vari (1991) as useful to distinguish *S. insculpta* from its congeners. Morphometric measurements of *S. insculpta* (Fig. 3) from the Bermejo river basin are presented in Table 1.

Meristic data: lateral line 41 (1), 42 (1), 43 (6), 44 (2), 45 (3), or 46 (4) perforated scales; scales in transverse series from dorsal-fin origin to lateral line not including the median scale, 7 (21), or 8 (1); scales in transverse series from anal-fin origin to lateral line not including median scale 6 (22); ventral scales anterior to pelvic fin 2 (1), 3 (18); scales between anus and anal-fin insertion 2 (2), 3 (18), 4 (2); predorsal scales 11 (4), 12 (10), 13 (5). Total dorsal-fin rays 11 (19), 12 (3); total anal-fin rays 9

**Table 1.** Morphometric measurements of *Steindachnerina insculpta* recorded to the Upper Bermejo river basin, including 10 specimens from CI-FML 7340 and 12 from CI-FML 7336. SD = standard deviation.

Measurements	Range	Mean	SD
Standard length (mm)	47.8–100.9	82.5	—
<b>Percentages of standard length</b>			
Greatest body depth	26.9–33.2	29.3	1.7
Snout to dorsal-fin origin	42.4–48.4	45.5	1.3
Snout to pectoral-fin origin	25.8–29.2	27.1	0.9
Snout to pelvic-fin origin	48.6–53.6	51.3	1.4
Snout to anal-fin origin	77.4–82.7	80.0	1.1
Snout to anus	71.2–75.8	73.6	1.1
Dorsal-fin origin to hypural joint	56.9–64.5	59.9	1.5
Dorsal-fin origin to anal-fin origin	41.7–47.8	45.2	1.3
Dorsal-fin origin to pelvic-fin insertion	27.0–33.2	29.6	1.7
Dorsal-fin origin to pectoral-fin insertion	26.3–34.7	31.0	1.7
Caudal-peduncle depth	10.8–12.5	11.7	0.5
Pectoral-fin length	17.3–21.1	19.2	1.0
Pelvic-fin length	19.4–23.4	21.1	1.1
Dorsal-fin length	23.5–30.4	26.4	1.9
Head length	25.4–29.3	27.0	0.9
<b>Percentages of head length</b>			
Snout length	30.5–36.7	33.2	1.7
Orbital diameter	23.9–30.8	27.6	1.4
Postorbital length	40.1–47.0	43.7	1.8
Interorbital width	36.9–43.4	40.3	1.5

(20), 10 (2); total pelvic-fin rays 9 (5), 10 (7); total pectoral-fin rays 13 (3), 14 (8), 15 (8), 16 (2), 17 (1); principal caudal-fin rays 9 + 8 (21), 10 + 8 (1); vertebrae 33 (1); pleural ribs 15 (1).

## Discussion

The known distribution range of *Steindachnerina insculpta* includes the type locality in the Upper Paraná river basin in Brazil, and an additional record in the Upper Paraguay river basin (Vari 1991). Koerber et al. (2017) cited *S. insculpta* as present in Paraguay, but considered its presence there as doubtful. The new records of *S. insculpta* in the Bermejo river basin, a tributary to the middle Paraná River, expand the geographic dis-

tribution by about 1000 km from the nearest records in the Paraná river basin. No records of this species have been reported from the middle and lower portions of the Paraná river basin, which could be due to the misidentification of *Steindachnerina* specimens. *Steindachnerina insculpta* was found syntopically with *S. conspersa* in the Bermejo River, and with *S. brevipinna* in the San Francisco River. The lack of a dark spot in the basal portion of the dorsal fin readily differentiates *S. insculpta* from these species, and additionally, the higher number of perforated scales on the lateral line distinguishes it from *S. brevipinna* (36–46 vs 33–37). This contribution provides the first records of *S. insculpta* in Argentine freshwaters, at 2 locations of the Upper Bermejo river basin in the provinces of Salta and Jujuy.

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## Authors' Contributions

GA analyzed the specimens, GT measured the specimens, FA made the map, and JMM compared the specimens with related species. All authors wrote the note and corrected the final version of the manuscript.

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**Figure 3.** *Steindachnerina insculpta*, CI-FML7340, 100.7 mm SL, from San Francisco River, Bermejo river basin.

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## Appendix

**Comparative material.** *Steindachnerina brevipinna*: Argentina, Jujuy, Libertador San Martín, San Francisco River, Bermejo river basin ( $23^{\circ}50'27''$  S,  $064^{\circ}37'24''$  W), September 2016, G. Aguilera, F. Alonso, M. Mirande and G. Terán (CI-FML 7214, 21 ex., 26.8–73.7 mm SL). *Steindachnerina conspersa*: Argentina, Salta, Rivadavia, La Unión, Madrejón El Divisadero, Bermejo River ( $23^{\circ}46'28''$  S,  $063^{\circ}04'0''$  W), May 2015, F. Alonso, M. Mirande and G. Terán (CI-FML 7338, 7 ex., 89.7–112.1 mm SL). *Steindachnerina insculpta*: Brazil, Londrina, Maravilla District, Taquara River, Paraná river basin, December 2006, W. Galves (CI-FML 7337 (ex MZUEL 4703), 2 ex., 102.7–105.6 mm SL).